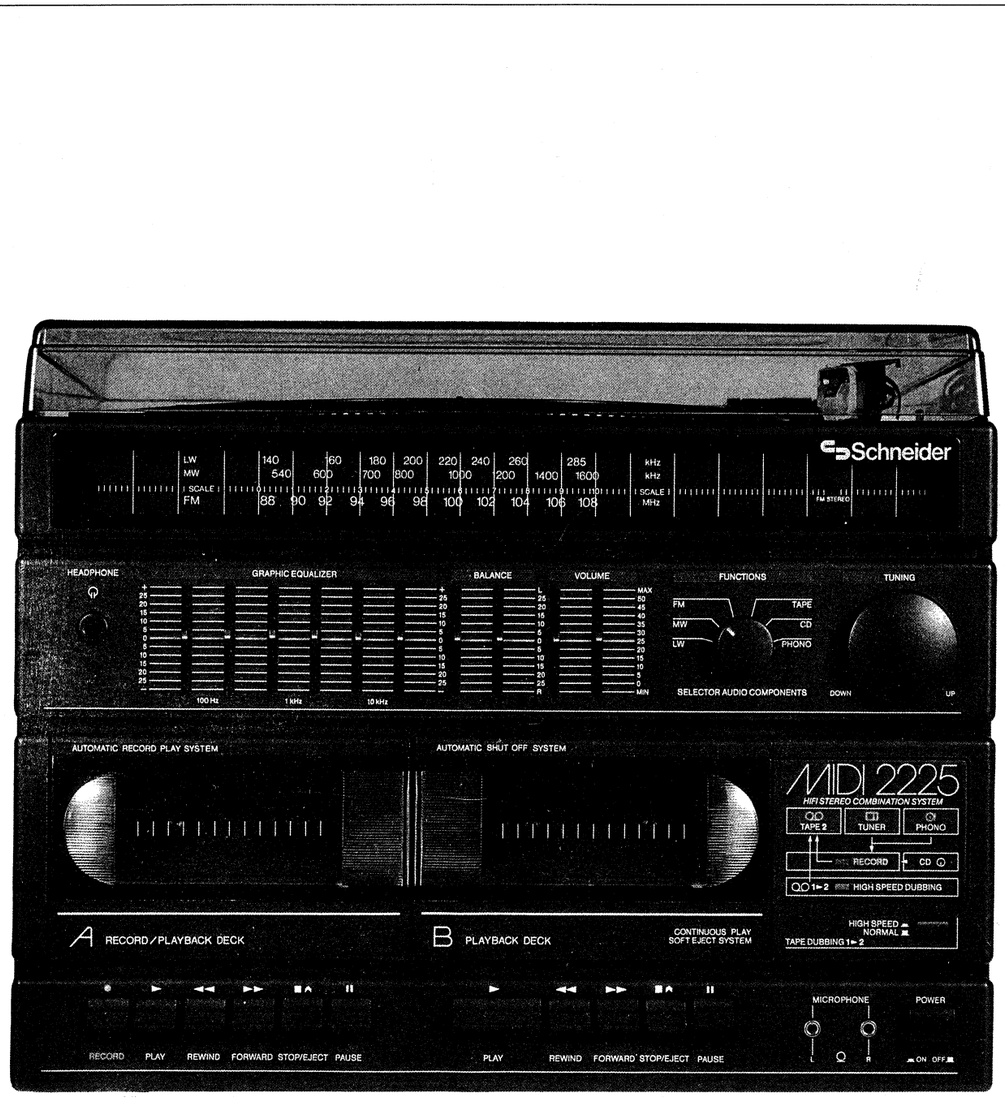
# Serviceanweisung

**Service Manual**

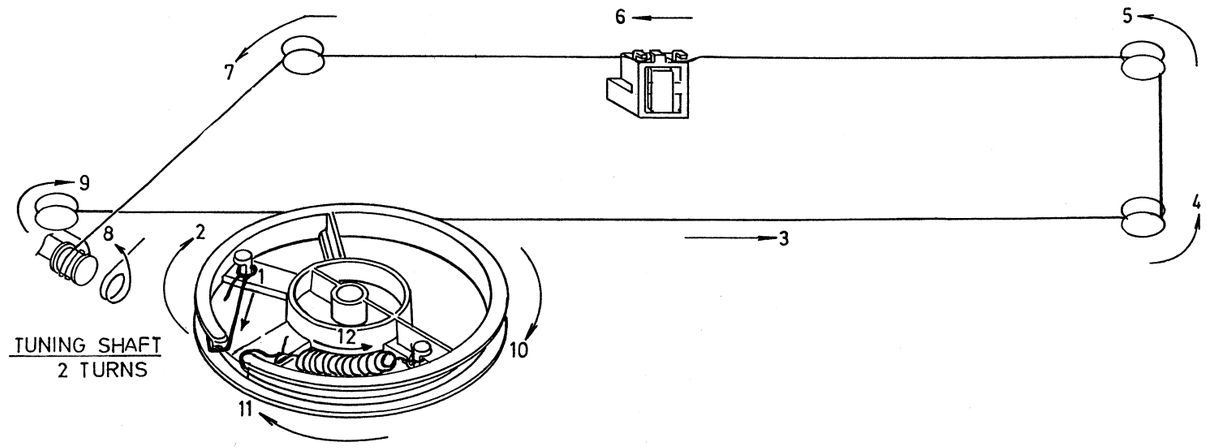
# MIDI 2225.05

**Ident-Nr. 42575**

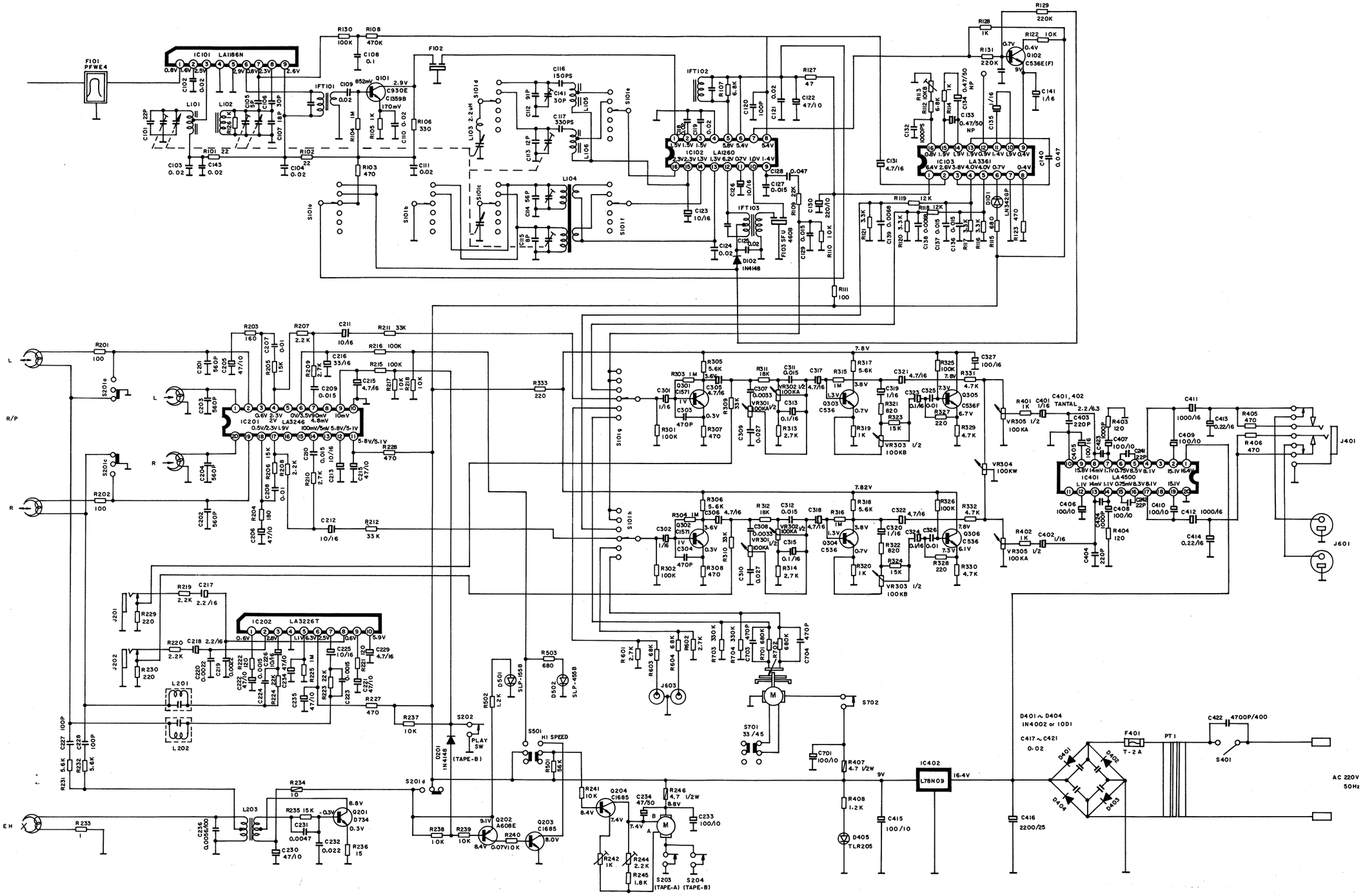



## Seilzugführung

**Dial stringing diagram**

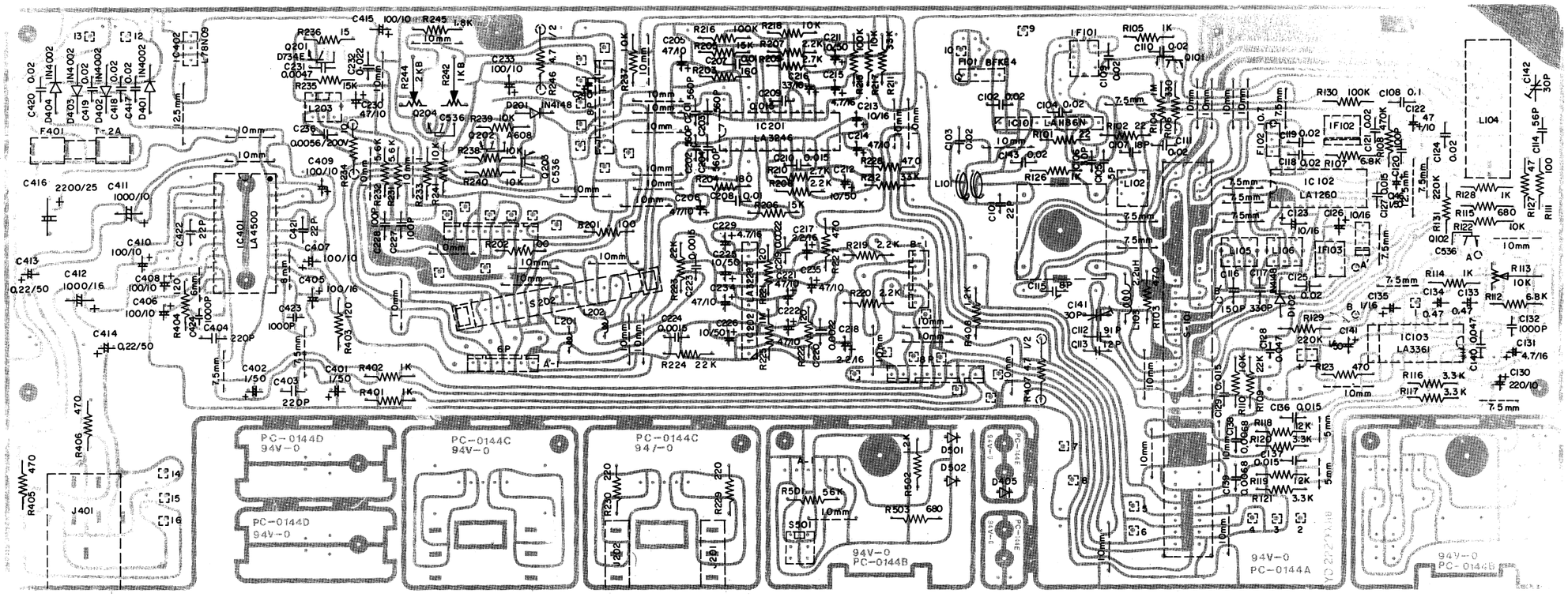


# Schaltbild
## Circuit diagram



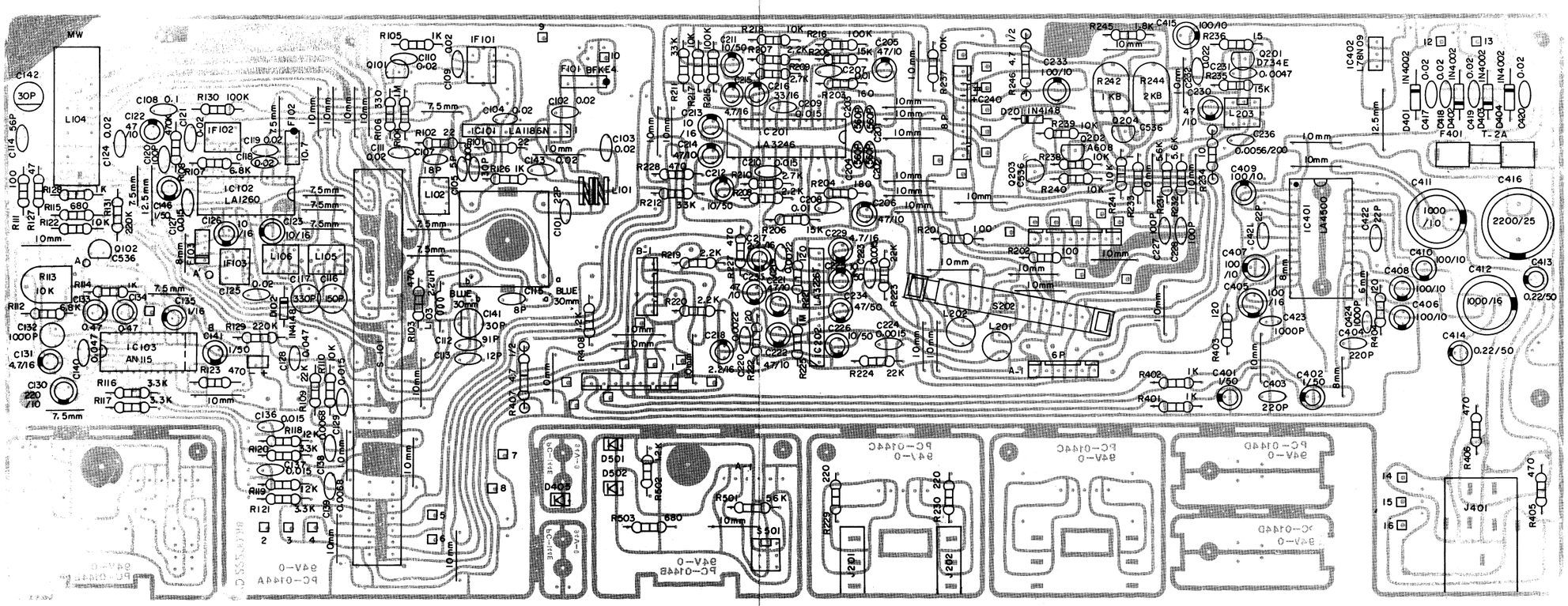
# Grundplatine
## Main P.C.B.

### Leiterbahnseite / Bottom view



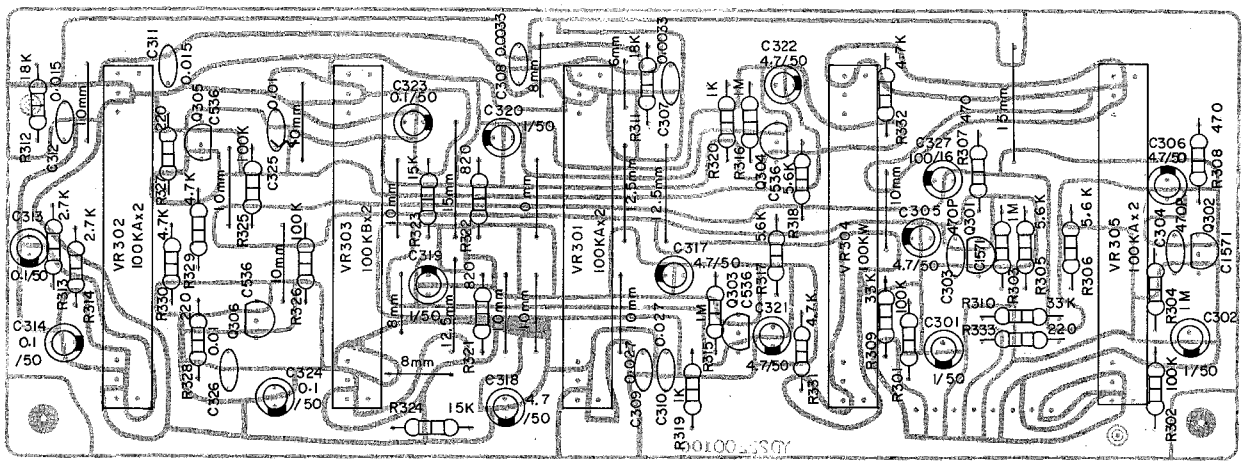
# Grundplatine
## Main P.C.B.

### Bestückungsseite / Top view

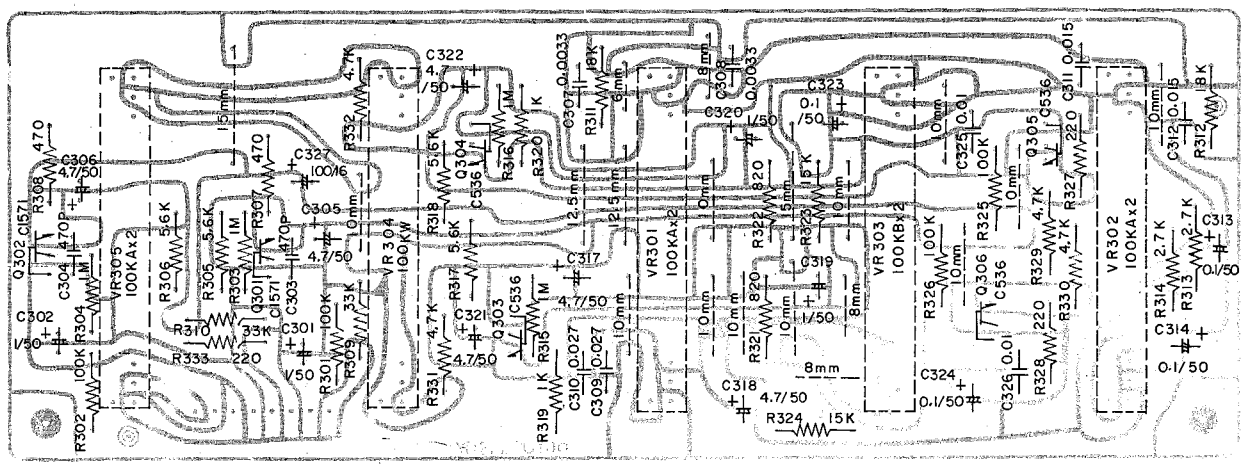


# Equalizerplatine
## Equalizer P.C.B.

### Bestückungsseite / Top view



### Leiterbahnseite / Bottom view



# Abgleichanweisung
## Alignment procedure

1

**LW**

GENERAL ALIGNMENT CONDITIONS

1. Signal input must be kept as low as possible to avoid overload and clipping.
   (Use highest possible sensitivity of output indicator.)

2. Signal input should be kept as low as possible to avoid A.G.C. action.
   (Set output indicator to highest sensitivity.)

3. Marker insertion and amplitude should not distort the oscillator and amplitude should not distort the oscilloscope trace.

4. Standard modulation is 400 Hz 30%.

INSTRUMENTS REQUIRED

Signal source

* AM signal generator *

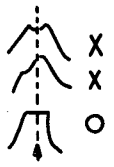
* Radio sweep generator *

* Sweep oscilloscope *

Output indicators

* AC millivolt meter *

* Oscilloscope *

| STEP | CONNECT SIGNAL SOURCE TO - | CONNECT OUTPUT INDICATOR - | SET SIGNAL OR INSERT MARKER | SET RADIO DIAL TO | ADJUST | ADJUST FOR - |
|---|---|---|---|---|---|---|
| 1 | Set function selector switch on the front panel to "LW" position. | | | | | |
| 2 | Sweep generator connected to a loop or short piece of wire placed near AM antenna | Sweep oscilloscope connected to wire pin of the C 411 or C 412 and volume to maximum | See amplitude of 460 KHz | Quiet point on band near 515 KHz | IFT 103 |  Amplitude of filter |
| 3 | Signal generator connected to a loop | AC millivolt meter and oscilloscope connected across speaker | 137 KHz | Scale - 0 | AM OSC L 105 | maximum |
| 4 | | | 290 KHz | Scale - 100 | OSC Trimmer C 141 | |
| 5 | | | 170 KHz | 170 KHz | AM ANT COIL L 104 | |
| 6 | | | 270 KHz | 270 KHz | RF Trimmer C 142 | |
| 7 | Repeat step 3 through 6 as necessary to obtain maximum sensitivity on station. | | | | | |

GENERAL ALIGNMENT CONDITIONS

1. Signal input must be kept as low as possible to avoid overload and clipping. (Use highest possible sensitivity of output indicator.)

2. Signal input should be kept as low as possible to avoid A.G.C. action. (Set output indicator to highest sensitivity.)

3. Marker insertion and amplitude should not distort the oscillator and amplitude should not distort the oscilloscope trace.

4. Standard modulation is 400 Hz

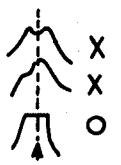
INSTRUMENTS REQUIRED

Signal source

* AM signal generator *
* Radio sweep generator *
* Sweep oscilloscope *

Output indicators

* AC millivolt meter *
* Oscilloscope *

| STEP | CONNECT SIGNAL SOURCE TO - | CONNECT OUTPUT INDICATOR - | SET SIGNAL OR INSERT MARKER | SET RADIO DIAL TO | ADJUST | ADJUST FOR - |
|---|---|---|---|---|---|---|
| 1 | Set function selector switch on the front panel to "MW" position. | | | | | |
| 2 | Sweep generator connected to a loop or short piece of wire placed near AM antenna | Sweep oscilloscope connected to wire pin of the C 411 or C 412 and volume to maximum | See amplitude of 460 KHz | Quiet point on band near 515 KHz | IFT 103 |  Amplitude of filter |
| 3 | Signal generator connected to a loop | AC millivolt meter and oscilloscope connected across speaker | 515 KHz | Scale - 0 | AM OSC L 106 | maximum |
| 4 | | | 1620 KHz | Scale - 100 | OSC Trimmer TC - 1 | |
| 5 | | | 600 KHz | 600 KHz | AM ANT COIL L 104 | |
| 6 | | | 1400 KHz | 1400 KHz | RF Trimmer TC - 2 | |
| 7 | Repeat step 3 through 6 as necessary to obtain maximum sensitivity on station. | | | | | |

GENERAL ALIGNMENT CONDITION

1. Signal input must be kept as low as possible to avoid overload clipping. (Use highest possitivity of output indicator.)

2. Markers must be accurate (crystal controlled or calibrated). The 10.7 MHz marker used in each section of the FM alignment must be the same.

3. Signal input should be kept as low as possible to avoid AGC action. (Set output indicator to highest sensitivity. )

4. FM signal generator RF output frequency must be monitoring.

5. Standard modulation is 1 KHz ( 40 KHz )

INSTRUMENTS REQUIRED

Signal sources

* FM signal generator *

* Radio sweep generator *

* Sweep oscilloscope *

* Frequency counter *

Output indicators

* AC millivolt meter *

* Oscilloscope *

* 114 KHz signal generator *

| STEP | CONNECT SIGNAL SOURCE TO - | CONNECT OUTPUT INDICATOR TO - | SET SIGNAL OR INSERT MARKER | SET RADIO DIAL TO | ADJUST | ADJUST FOR |
|---|---|---|---|---|---|---|
| 1 | Set function selector switch on the front panel to " FM " position. | | | | | |
| 2 | Radio sweep generator connect to C 106 | Oscilloscope connected to wire pin of the C 411 or C 412 and volume VR to maximum | 10.7 MHz | Quiet scale pointer on band | IFT 101 | Maximum gain with symmetrical curve peaked at 10.7 MHz marker |
| 3 | | | 10.6<br>10.7<br>10.8 MHz<br>marker | | IFT 102 | Straightness and symmetry of " S " curve with 10.7 MHz markerd at zero crossover |
| 4 | Repeat steps 2 through 3 as necessary to obtain maximum gain and selectivity. | | | | | |
| 5 | FM signal generotor output soupled to FM aerial. Steps 5,6 frequency must be monitored by frequency counter | AC millivolt meter and oscilloscope connected across loadspeaker socket | 87.35 MHz | Scale - 0 | L 102 | maximum |
| 6 | | | 108.25 MHz | Scale -100 | OSC Trimmer FC - 1 | |
| 7 | | | 90 MHz | 90 MHz | L 101 | |
| 8 | | | 106 MHz | 106 MHz | RF Trimmer FC - 2 | |

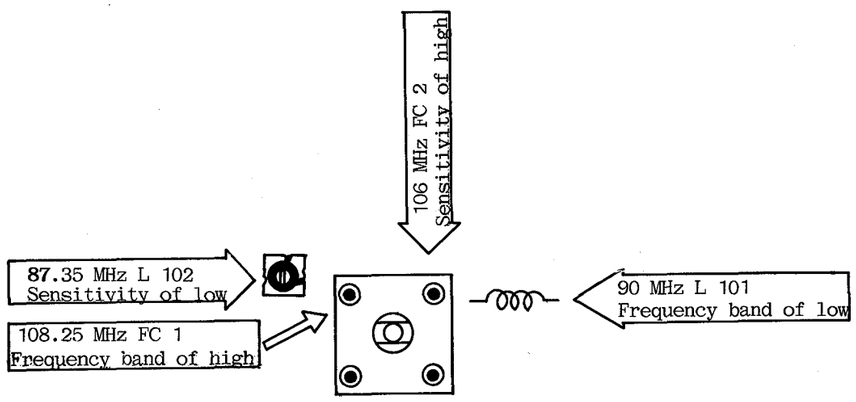
| Best.-Nr./Part No. | Bezeichnung | Description | Position | Preisgruppe |
|---|---|---|---|---|
| 46 407 00 | Frontblende | Front panel | A 1 | C 5 |
| 40 783 00 | Abdeckhaube | Dust cover | A 2 | C 6 |
| 40 784 00 | Senderskala | Dial plate | A 3 | B 1 |
| 40 785 00 | Skalenfenster | Dial window | A 4 | B 2 |
| 40 786 00 | Taste High speed | Button high speed | A 5 | A 2 |
| 40 787 00 | Drehknopf Funktion | Knob function | A 6 | A 3 |
| 40 788 00 | Taste Power | Button power | A 7 | A 2 |
| 40 014 00 | Drehknopf Tuning | Knob tuning | A 8 | A 3 |
| 40 000 00 | Taste Eq. Schieberegler (5) | Knob eq. vr. | A 9 | A 3 |
| 40 789 00 | Gehäuseboden | Bottom board | A 10 | B 1 |
| 40 020 00 | Skalenzeiger | Dial pointer | B 1 | A 2 |
| 34 585 00 | Seilrad | Dial drum | B 2 | A 4 |
| 29 899 00 | Feder für Seilrad | Spring dial drum | B 4 | A 0 |
| 40 025 00 | Skalenantriebsachse | Tuning shaft | B 5 | A 7 |
| 12 053 00 | Seilrolle (4) | Pulley | B 6 | A 1 |
| 40 790 00 | Dämpfrad | Damper gear | B 15 | A 2 |
| 40 791 00 | Dämpfradhalter | Damper holder | B 16 | A 2 |
| 21 488 00 | Gehäusefuß | Gum foot | B 17 | A 3 |
| 40 792 00 | Kassettenfach Tape A kompl. | Cassette case Tape A assembly | C 1-3-5 | B 6 |
| 40 793 00 | Kassettenfach Tape B kompl. | Cassette case Tape B assembly | C 1-4-6 | B 6 |
| 40 028 00 | Taste Kassette schmal | Key cassette | C 7 | A 3 |
| 40 029 00 | Taste Kassette breit | Key cassette | C 8 | A 3 |
| 40 794 00 | Hebel Aufnahme | Lever record | C 10 | A 4 |
| 40 795 00 | Feder Kassettenfach | Spring cassette open | C 12 | A 1 |
| 40 796 00 | Zugfeder Aufnahmeschiebehebel | Spring record slider | C 13 | A 1 |
| 40 797 00 | Zugstange AW-Schalter | Rod R-P switch | C 14 | A 1 |
| 29 937 00 | Sicherungsscheibe | E-Ring | D 23 | A 1 |
| 46 180 00 | Gehäuse | Changer cabinet | F 1 | D 6 |
| 40 246 00 | IC LA 1186 N | | IC 101 | B 0 |
| 26 797 00 | IC LA 1260 | | IC 102 | B 4 |
| 40 799 00 | IC LA 3246 | | IC 201 | B 2 |
| 40 037 00 | IC LA 3226 T | | IC 202 | B 2 |
| 29 904 00 | IC LA 4500 | | IC 401 | C 2 |
| 24 540 00 | IC L 78 N 09 | | IC 402 | B 1 |
| 21 596 00 | IC LA 3361 | | IC 103 | B 1 |
| 11 241 00 | Diode 1 N 4148 | | D 102, 201 | A 2 |
| 12 039 00 | Diode 10 D 1 FD | | D 401-404 | A 4 |
| 32 148 00 | Trans 2 SC 930 E | | Q 101 | A 2 |
| 13 546 00 | Trans 2 SD 734 E | | Q 201 | A 4 |
| 13 545 00 | Trans 2 SC 536 F | | Q 203 | A 3 |
| 13 545 00 | Trans 2 SC 536 F | | Q 204 | A 3 |
| 13 545 00 | Trans 2 SC 536 F | | Q 303 | A 3 |
| 13 545 00 | Trans 2 SC 536 F | | Q 304 | A 3 |
| 13 545 00 | Trans 2 SC 536 F | | Q 305 | A 3 |
| 13 545 00 | Trans 2 SC 536 F | | Q 306 | A 3 |
| 21 312 00 | Trans 2 SA 608 E | | Q 202 | A 4 |
| 13 988 00 | Trans 2 SC 1571 F | | Q 301/302 | A 6 |
| 24 534 00 | LED rot Aufnahme | LED red record | D 501 | A 2 |
| 24 982 00 | LED gelb High speed | LED yellow high speed | D 502 | A 4 |
| 29 009 00 | LED grün Stereo | LED green stereo | D 101 | A 4 |
| 14 153 00 | LED rot Skala | LED red dial | D 405 | A 7 |
| **Spulen, Filter, Trafo** | | | | |
| 40 801 00 | Ferritantenne | Bar antenna | L 104 | B 3 |
| 34 325 00 | Spule Löschoszillator | Tape osc. coil | L 203 | A 5 |
| 34 326 00 | Fangspule | Tape trap coil | L 201-2 | A 4 |
| 13 531 00 | FM-Antennenfilter PFWE 4 | FM-balum filter | F 101 | A 7 |
| 24 995 00 | Filter Keramik FM-SFE 10,7 | Filter ceramic FM-SFE 10.7 | F 102 | A 6 |
| 13 673 00 | Filter Keramik MW SFU 460 B | Filter ceramic MW SFU 460 B | F 103 | B 1 |
| 46 408 00 | Netztrafo kpl. mit Platine | Power transformer P.C.B. assembly | | D 1 |
| **Schalter, Schieberegler, Sonstiges** | | | | |
| 40 803 00 | Funktionsschalter | Function rotary switch | S 101 | B 7 |
| 34 033 00 | AW-Schiebeschalter | R/P switch | S 202 | A 8 |
| 40 304 00 | Schalter High speed | Switch high speed | S 501 | B 0 |
| 34 330 00 | Netzschalter | Power switch | S 401 | B 0 |
| 46 409 00 | Schieberegler Volume 100 K | Slide resistor volume 100 K | VR 305 | B 0 |
| 46 410 00 | Schieberegler Balance 100 K | Slide resistor balance 100 K | VR 304 | A 9 |
| 46 411 00 | Schieberegler Eq. 100 K (1 kHz) | Slide resistor eq. 100 K (1 kHz) | VR 303 | B 0 |
| 46 409 00 | Schieberegler Eq. 100 K (100 Hz, 10 kHz) | Slide resistor eq. 100 K (100 Hz, 10 kHz) | VR 301-2 | B 0 |
| 21 513 00 | Buchse Mikrofon Klinken 3,5 | Jack microphone | J 201-2 | A 9 |
| 40 031 00 | Lautsprecherbuchse doppel | Speaker jack | | A 8 |
| 32 952 00 | Buchse Chinch doppel | Chinch jack | | A 6 |
| 13 986 00 | Buchse Kopfhörer 6,3 | Jack headphone | | B 0 |
| 26 543 00 | Sicherungswiderstand 10 Ω ¼ W | Fuse resistor 10 Ω ¼ W | R 234 | A 3 |
| 31 129 00 | Sicherungswiderstand 10 Ω ½ W | Fuse resistor 10 Ω ½ W | R 246-407 | A 2 |

| Best.-Nr./Part No. | Bezeichnung | Description | Position | Preisgruppe |
|---|---|---|---|---|
| **Platinen kompl./P.C. board assembly** | | | | |
| 46 412 00 | Grundplatine | Main board | | F 4 |
| 46 413 00 | Equalizerplatine | Equalizer board | | C 9 |
| 46 414 00 | Mikrofonbuchsenplatine | Mic. jack board | | B 7 |
| 40 811 00 | High-Speed-Platine | High speed board | | C 3 |
| 40 812 00 | Buchsenplatine CD; LS | Jack board CD; Speaker | | B 9 |
| 46 415 00 | Phono-Anschlußplatine | Phono board | | A 9 |
| 46 416 00-501 | **Doppel-Cass.-Deck TN 21 ZSW-507** | **Double Cass.-Deck TN 21 ZSW-507** | C 16 | F0 |
| 44 128 00 | Feder Pausenrasthebel | Spring pause lever | 10 | A 0 |
| 46 417 00 | Pauserasthebel | Pause lever | 11 | A 0 |
| 44 130 00 | Druckfeder Pauserasthebel | Spring pause lever | 12 | A 0 |
| 44 131 00 | Sicherungsstöpsel Pause | Pause stopper | 13 | A 0 |
| 32 428 00 | Feder Tastenhebel | Spring button lever | 14 | A 3 |
| 32 423 00 | Feder Tastenhebel | Spring button lever | 22 | A 3 |
| 44 132 00 | Mikroschalter »Main« | Leaf switch main | 23 | A 4 |
| 32 432 00 | Feder Löschkopf | Erase head spring | 33 | A 3 |
| 32 435 00 | Feder AW-Kopf | Spring R/P head | 34 | A 3 |
| 44 134 00 | Bandandruckrolle kompl. | Pinch roller arm assembly | 35 + 36 | A 6 |
| 44 135 00 | Tasthebel | Sensing lever | 38 | A 1 |
| 44 138 00 | Riemen Rutschkupplung | Belt RF | 40 | A 4 |
| 44 139 00 | Schwungmasse kompl. A/W | Flywheel R-P | 44 . . . | B 4 |
| 40 816 00 | Schwungmasse kompl. Play | Flywheel Play | 43 . . . | B 4 |
| 44 136 00 | Kurvenzahnrad | Cam gear | 47 | A 2 |
| 44 140 00 | Zahnrad Vorlauf | FF gear | 49 | A 1 |
| 44 319 00 | Feder Wickelteller links | Spring back tension | 50 | A 0 |
| 44 141 00 | Wickelteller links | Supply reel left | 51 | A 3 |
| 44 142 00 | Wickelteller rechts kompl. | Take-up reel assembly | 52 | A 4 |
| 46 436 00 | Spange, Wickelteller | Sensor | 53 | |
| 32 453 00 | Gummipuffer Motor | Motor rubber | 56 | A 2 |
| 32 454 00 | Schraube Motor | Motor collar screw | 57 | A 2 |
| 44 778 00 | Pulley-Motor | Pulley motor | 58 | A 6 |
| 40 818 00 | Antriebsriemen | Main belt | 59 | A 3 |
| 46 418 00 | Gleithebel Eject | Eject slide lever | 62 | A 3 |
| 32 459 00 | Cassettenandruckfeder | Pack spring | 64 | A 5 |
| 34 348 00 | Wiedergabekopf | Play head | 65 | C 6 |
| 34 349 00 | AW-Kopf | R/P head | 66 | C 6 |
| 24 513 00 | Löschkopf | Erase head | 67 | B 0 |
| 46 419 00 | Antriebsmotor | Motor | 68 | C 6 |
| 32 451 00 | Aufnahmesperrhebel | Record safety lever | 69 | A 5 |
| 44 133 00 | Mikroschalter Play | Leaf switch | 70 | A 7 |
| 32 462 00 | Sicherungsscheibe Schwungmasse | Polyslider washer flywheel | 85 | A 0 |
| **Plattenspieler/Record player** | | | | |
| 46 420 00 | Plattenteller | Turntable | F 2 + 4 | C 0 |
| 24 025 00 | Antriebsriemen | Belt | F 3 | B 2 |
| 40 833 00 | Endschalthülse | Pinion | F 4 | A 3 |
| 40 823 00 | Achse Plattenteller | Spindle turntable | F 6 | A 6 |
| 46 426 00 | Tonarm kompl. | Tonearm assembly | F 8 + 13 | B 9 |
| 44 780 00 | Endschalthebel kompl. | Stop plate assembly | F 14-18 | B 2 |
| 46 421 00 | Pulley-Motor | Pulley motor | | A 3 |
| 40 830 00 | Motorschalter kompl. | Switch motor assembly | F 20-24 | A 6 |
| 40 831 00 | Tonarmhebel | Control lever | F 25 | A 3 |
| 40 832 00 | Endschaltstange | Trip lever | F 27 | A 1 |
| 37 979 00 | Taste 33/45 | Knob speed | F 28 | A 3 |
| 37 813 00 | Haubenscharnier | Hinger | F 29 | B 0 |
| 46 422 00 | Auflagegummi Plattenteller | Gum cushion | F 30 | A 2 |
| 46 423 00 | Antriebsmotor SHR 2 R | Motor SHR 2 R | F 31 | C 5 |
| 46 424 00 | System | Cartridge | F 32 | C 0 |
| 46 425 00 | Abtastnadel | Stylus | | B 7 |
| 29 937 00 | Sicherungsring Plattenteller | E-ring turntable | D 23 | A 0 |
| 12 828 00 | Schalter 33/45 | Switch 33/45 | G 11 | B 0 |
| 46 435 00 | Faltkarton 2225 | Carton 2225 | | |
| 46 427 00 | Styropor rechts | Poly foam right | | B 4 |
| 46 428 00 | Styropor links | Poly foam left | | B 4 |
| 46 429 00 | Styropor li. re. Lautsprecher | Poly foam speaker | | A 9 |
| 42 576 00 | Lautsprecherbox 2225 LS | Speaker box assembly 2225 LS | | D 3 |

4

FM

| STEP | CONNECT SIGNAL SOURCE TO - | CONNECT OUTPUT INDICATOR TO - | SET SIGNAL OR INSERT MARKER | SET RADIO DIAL TO | ADJUST | ADJUST FOR - |
|---|---|---|---|---|---|---|
| 9 | Repeat steps 5 through 8 as necessary to obtain maximum sensitivity. | | | | | |




5

MPX

GENERAL ALIGNMENT CONDITION

1. Adjust FM signal generator output to 1 mV (60dB) with MPX modulation 1 KHz

   Deviation = 33.75 KHz  Pilot = 6 KHz

INSTRUMENTS REQUIRED

Signal source
* FM signal generator *
* Stereo signal generator *

Output indicator
* Frequency counter *
* AC millivolt meter *
* Oscilloscope *

| STEP | CONNECT SIGNAL SOURCE TO - | CONNECT OUTPUT INDICATOR TO - | SET SIGNAL | SET RADIO DIAL | ADJUST | ADJUST FOR |
|---|---|---|---|---|---|---|
| 1 | Set function selector switch on the front panel to " FM STEREO " position. | | | | | |
| 2 | FM signal generator connected to FM aerial | Frequency counter connect to MPX test point | 98 MHz and modulation off, pilot signal off too | 98 MHz | R 113 | 19.00 KHz + / - 50 Hz |

6

CASSETTE TAPE

INSTRUMENT REQUIRED

1. Audio signal generator.
2. Audio attenuator (600 OHM).
3. Dual trace oscilloscope.
4. Dual trace AC millivolt meter.
5. Frequency counter.

ADJUSTMENT

1. PLAYBACK

| STEP | | MEASURING INSTRUMENT ARRANGEMENT | TEST TAPE | ADJUST POINT | ADJUSTMENT |
|---|---|---|---|---|---|
| 1 | Azimuth and phase | Take out the signal from loadspeaker socket L and R | MTT - 114 (10 KHz-10dB) | R / P head | Adjust to maximum output and synchonize phase |
| 2 | Tape NOR speed | | MTT - 111 (3 KHz-10dB) | R 242 | Adjust to 3 KHz + 3 / -2% at frequency counter display |
| 3 | Tape HI speed | | MTT - 111 (3 KHz - 10dB) | R 244 | Adjust to 4.8 KHz + 3 / -2% at frequency counter display |

| STEP | | MEASURING INSTRUMENT ARRANGEMENT | OUTPUT POINT | OUTPUT POINT | ADJUSTMENT |
|---|---|---|---|---|---|
| 1 | Bias frequency | Frequency counter connect to erase head wire pin | Erase head wire pin | L 203 | 85 KHz ( + / - 5 KHz) |

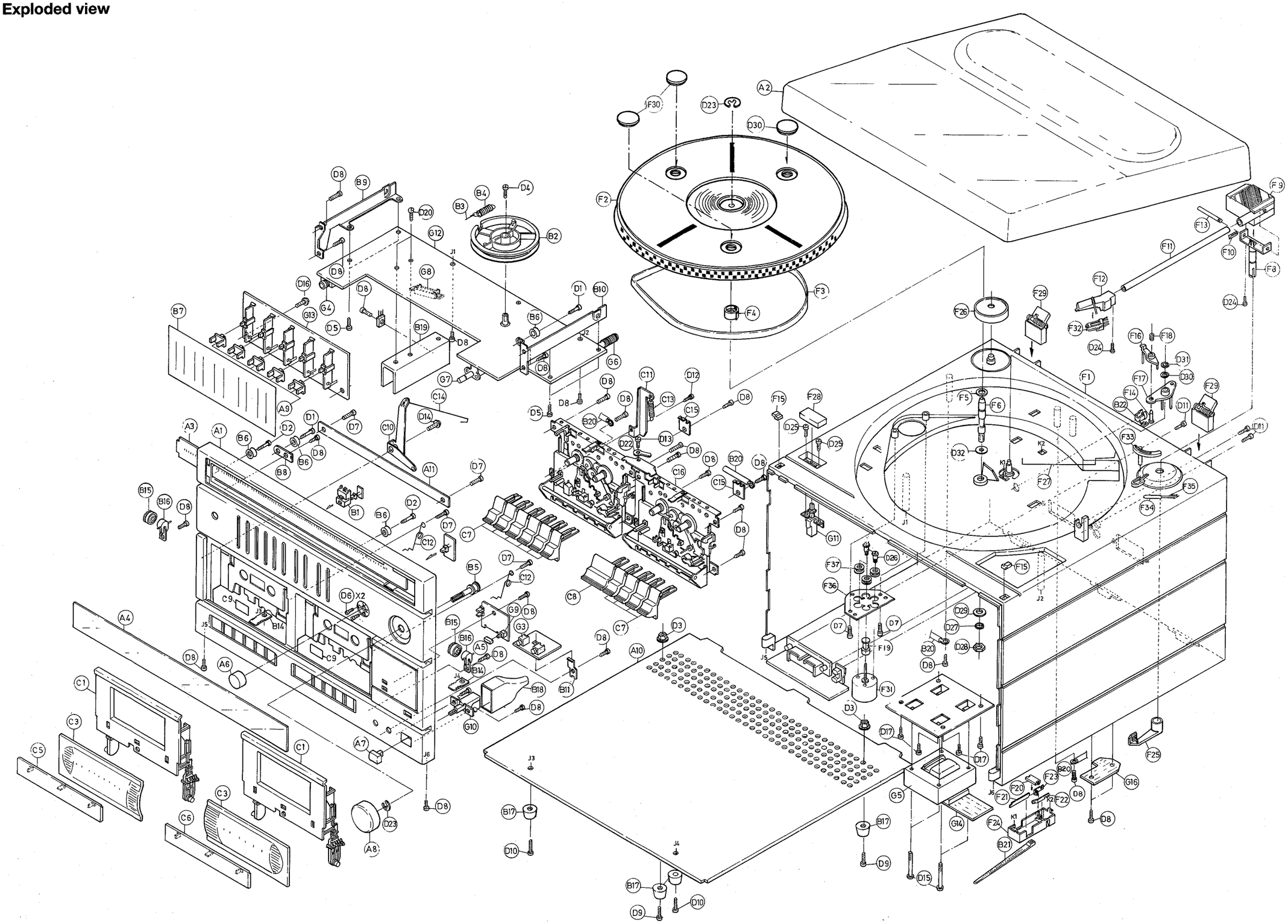
Height of:

Erase voltage (E-Head): ca. 100 Vpp

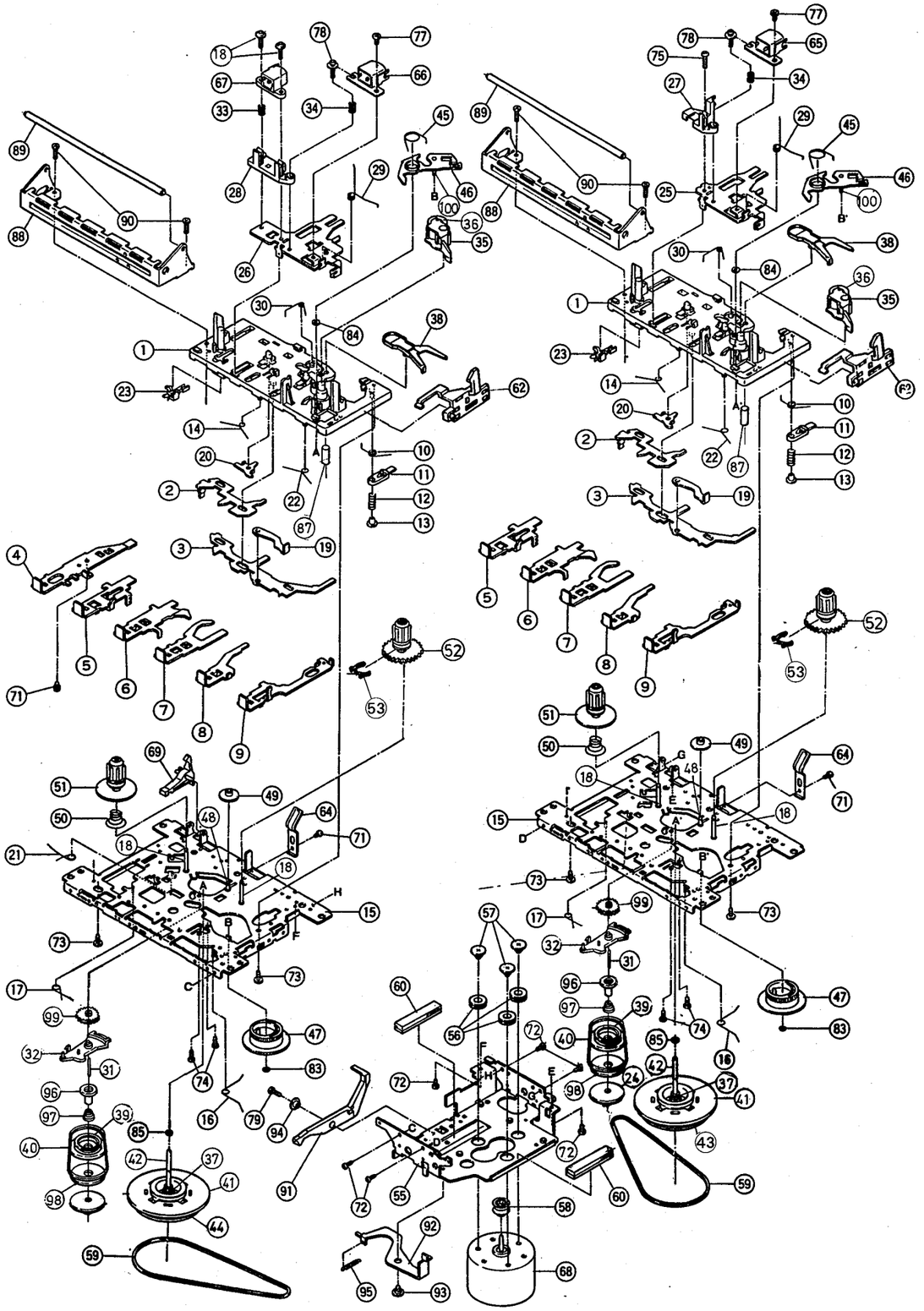
Bias voltage (R/P-Head): ca. 35 Vpp

(measured with oscilloscope)

# Explosionsdarstellung
## Exploded view



# Explosionsdarstellung Cassettenmechanik
## Exploded view cassette mechanism



Bitte bei Ersatzteilbestellung die genaue Bezeichnung und **Ident-Nr.** (siehe Typenschild) des Gerätes sowie Bestell-Nummer und Positions-Nummer des Ersatzteils angeben.

For ordering of spare parts please state exact description and **ident no.** of unit (see silver rating label on the backside of unit) as well as part no. and position no. of required spare parts.

Benutzen Sie:

Telex: 531516

oder

Bildschirmtext ✱317298#

Technische Änderungen vorbehalten.
Technical modifications reserved.

4643400 HDS 67237/7000/24/89